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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/032,200 | 12/21/2001 | Michel Deeba | 4007 | 4939 |

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| EXAMINER | |
|---|---|
| TRAN, BINH Q | |
| **ART UNIT** | **PAPER NUMBER** |
| 3748 | |

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application N . | Applicant(s) |
|---|---|---|
| | 10/032,200 | DEEBA, MICHEL |
| | **Examiner** | **Art Unit** |
| | BINH Q. TRAN | 3748 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *15 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *3-18,20,25 and 26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-18, 20, 25-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

## DETAILED ACTION

This office action is in response to the amendment filed February 06, 2004.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

***Claims 3-5, 10-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirota et al. (Hirota'927) (Patent Number 6,233,927 B1) in view of Hirota et al. (Hirota'246) (Patent Number 6,367,246 B1).***

Regarding claims 3, 17-18, Hirota'927 discloses a diesel engine exhaust system comprising: a soot filter (e.g. 7, 19); and low temperature NO2 trap (11) deposited on a carrier upstream and in train with the soot filter; and wherein the low temperature NOx trap material adsorbs NOx at lower temperatures and releases the NOx at higher temperatures to regenerate the NOx trap material (See col. 3, lines 32-67; col. 4, lines 1-14). However Hirota'927 fails to disclose that the low temperature NO2 trap material comprising zeolites selected from the group consisting of acidic zeolites and base metal-exchanged zeolites.

Hirota'246 teaches that it is conventional in the art, to use a low temperature NO2 trap material comprising zeolites selected from the group consisting of acidic zeolites and base metal-exchanged zeolites (e.g. See Abstract; col. 3, lines 32-67; col. 4, lines 1-14), which are carried on a carrier for absorbing the NOx when the air-fuel ratio of the exhaust gas flowing into the absorbent is

lean, and releasing the NOx when the air-fuel ratio of the exhaust gas flowing into the absorbent is rich.

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to use a low temperature NO2 trap material comprising zeolites selected from the group consisting of acidic zeolites and base metal-exchanged zeolites of Hirota'927, as taught by Hirota'246 for the purpose of absorbing the NOx when the air-fuel ratio of the exhaust gas flowing into the absorbent is lean, and releasing the NOx when the air-fuel ratio of the exhaust gas flowing into the absorbent is rich, so as to reduce the poisoned materials in the purifying catalyst and to reduce amount of nitrogen oxides in the exhaust gas of the lean-burn engine, and further improve the performance of the engine and the efficiency of the emission device.

Regarding claim 4, Hirota'246 further discloses that the zeolites are selected from the group consisting of ZSM-5, ETS-I0, y zeolite, Beta zeolite, ferrierite, mordenite, titanium silicates, and aluminum phosphates (See col. 11, lines 5-47).

Regarding claim 5, Hirota'246 further discloses that the base metals are selected from the group consisting of Mn, Cu, Fe, Co, W, Re, Sn, Ag, Zn, Mg, Li, Na, K, Cs, Nd, Pr and combinations thereof (See col. 11, lines 5-47).

Regarding claim 10, Hirota'927 further discloses that the a diesel oxidation catalyst (18) upstream of the soot filter (7) (See Fig. 4).

Regarding claim 11, Hirota'927 further discloses that the NO2 trap material (11) is deposited on a carrier that is interposed and in train with the diesel oxidation catalyst (18) and the soot filter (7) (See Fig. 4).

Regarding claim 12, Hirota'246 further discloses that the system comprising a canister, wherein the canister houses both the low temperature NO2 trap material and the soot filter (See Fig. 4; col. 6, lines 10-56).

Regarding claim 13, Hirota'246 further discloses that the soot filter comprises a ceramic monolithic structure having an upstream axial end and a downstream axial end, the structure having parallel flow channels with macroporous walls, wherein the channels having an opening at the upstream axial end are closed at the downstream axial end, and the channels having an opening at the downstream axial end are closed at the upstream axial end, thereby defining upstream and downstream sides of the channel walls (See col. 3, lines 32-67; col. 4, lines 1-14).

Regarding claim 14, Hirota'246 further discloses a catalyst composition is deposited on the downstream side of the channel walls of the soot filter (See col. 3, lines 32-67; col. 4, lines 1-14).

Regarding claim 15, Hirota'246 further discloses that the catalyst composition, deposited on the downstream side of the channel walls of the soot filter, comprises a lean NOx catalyst composition (See col. 3, lines 32-67; col. 4, lines 1-14).

Regarding claim 16, Hirota'246 further discloses that the catalyst composition, deposited on the downstream side of the channel walls of the soot filter, comprises a catalyst composition effective for the combustion of unburned hydrocarbons and carbon monoxide (See col. 3, lines 32-67; col. 4, lines 1-14).

Regarding claim 20, Hirota'246 further discloses that the exhaust system further comprises a lean NOx catalyst deposited on the soot filter (See col. 3, lines 32-67; col. 4, lines 1-14).

***Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirota'927 in view of Hirota'246 as applied to claims 3, 17-18, and 21 above, and further in view of Deeba et al. (Deeba) (Patent Number 6,093,378).***

Regarding claim 6, Hirota'927 in view of Hirota'246 discloses all the claimed limitation as discussed above except that the zeolites comprise a trivalent metal which in combination with Si forms an oxidic skeleton

Deeba discloses a diesel engine exhaust system comprising: a low temperature NO2 trap material comprising zeolites selected from the group consisting of acidic zeolites and base metal-exchanged zeolites, and wherein the low temperature NO2 trap material is deposited on a carrier, wherein the zeolites comprise a trivalent metal which in combination with Si forms an oxidic skeleton (See col. 10, lines 5-67; col. 11, lines 1-45).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to use a low temperature NO2 trap material comprising zeolites selected from the group consisting of acidic zeolites and base metal-exchanged zeolites of Hirota'927 in view of Hirota'246, as taught by Deeba for the purpose of absorbing the NOx when the air-fuel ratio of the exhaust gas flowing into the absorbent is lean, and releasing the NOx when the air-fuel ratio of the exhaust gas flowing into the absorbent is rich, so as to reduce the poisoned materials in the purifying catalyst and to reduce amount of nitrogen oxides in the exhaust gas of the lean-burn engine, and further improve the performance of the engine and the efficiency of the emission device.

Regarding claim 7, Deeba further discloses that the trivalent metal comprises at least one metal selected from the group consisting of Al, B, Ga, In, Fe, Cr, V, As and Sb (See col. 10, lines 5-67; col. 11, lines 1-45).

Regarding claim 8, Deeba further discloses that the zeolites comprise three-dimensional alumina-silicate zeolites characterized by pore openings whose smallest cross-section dimensions are at least 5 Angstroms and having a silicon to alumina ratio of at least 5 (See col. 10, lines 5-67; col. 11, lines 1-45).

Regarding claim 9, Deeba further discloses that the zeolites comprise titanium silicates (See col. 12, lines 10-67; col. 13, lines 1-32).

***Claims 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirota'927 in view of Hirota'246 as applied to claims 3, 17-18, and 21 above, and further in view of design choice.***

Regarding claims 25-26, Hirota'927 in view of Hirota'246 discloses all the claimed limitation as discussed above except that the NO2 trap material adsorbs NO2 at $25^0$C to 200 $^0$C and releases the NO2 above 175 $^0$C.

Regarding the specific range of NOx catalyst temperature, it is the examiner's position that a range to adsorb NO2 at $25^0$C to 200 $^0$C and release the NO2 above 175 $^0$C of the catalyst temperature, would have been an obvious matter of design choice well within the level of ordinary skill in the art, depending on variables such as mass flow rate of the exhaust gas, as well as the concentration of oxygen in the exhaust gas, properties of materials for making the NOx storage catalyst, and the controlled temperature of the catalytic converter. Moreover, there is nothing in the

record which establishes that the claimed parameters present a novel or unexpected result (See In re Kuhle, 562 F. 2d 553, 188 USPQ 7 (CCPA 1975)).

Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art. In re Dreyfus, 22 CCPA (Patents) 830, 73 F.2d 931, 24 USPQ 52; In re Waite et al., 35 CCPA (Patents) 1117, 168 F.2d 104, 77 USPQ 586. Such ranges are termed "critical" ranges, and the applicant has the burden of proving such criticality. In re Swenson et al., 30 CCPA (Patents) 809, 132 F.2d 1020, 56 USPQ 372; In re Scherl, 33 CCPA (Patents) 1193, 156 F.2d 72, 70 USPQ 204. However, even though applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art. In re Sola, 22 CCPA (Patents) 1313, 77 F.2d 627, 25 USPQ 433; In re Normann et al., 32 CCPA (Patents) 1248, 150 F.2d 627, 66 USPQ 308; In re Irmscher, 32 CCPA (Patents) 1259, 150 F.2d 705, 66 USPQ 314. More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et al., 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Mining and Mfg. Co. v. Coe, 69 App. D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App. D.C. 324, 135 F.2d 11, 57 USPQ 136.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Binh Tran whose telephone number is (703) 305-0245. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reach on (703) 308-2623. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0861.

BT
May 29, 2004

Binh Tran
Patent Examiner
Art Unit 3748